

PATENT COOPERATION TREATY

APZU Rec'd PCT/PTO 22 JUN 2006

In Re Application No.: PCT/US2005/00095
Filing Date: 4 January 2005
Applicant: Cooper-Standard Automotive Inc.
For: INDENTED TUBE FOR A HEAT EXCHANGER
Attorney Docket: 60158-286

Mail Stop PCT
ATTN: IPEA/US
Commissioner of Patents
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Alexandria, VA 22313-1450

REPLY TO WRITTEN OPINION

Dear Sir:

This reply is in response to the Written Opinion under PCT Rule 66 dated May 31, 2006 and having a period of response of one (1) month. Applicant hereby requests that the above-identified application be amended as follows:

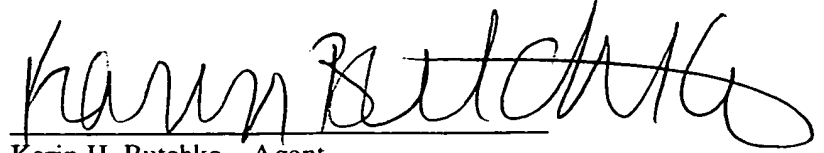
Please insert new pages 6, 7 and 7A, enclosed herewith, presenting new claims 1 to 28, replacing pages 6 and 7 including claims 1 to 17 filed under Article 19 and received by the authority on August 30, 2005, which are hereby cancelled.

The Examiner contends that claims 1-3, 5, 7 and 9-14 lack novelty under PCT Article 33(2) as being anticipated by Takashi. Takashi does not disclose a tube including a plurality of indentations formed by crimping as claimed. Takashi discloses a row of projections 3 formed by pressing a rolling disc 1 with gear teeth on a tube 2 (column 2, lines 37 to 41). However, the projections 3 are not formed by crimping as claimed. The claimed invention is not anticipated by Takashi.

The Examiner contends that claims 1-8 and 10-16 lack novelty under PCT Article 33(2) as being anticipated by Beutler and that claim 17 lacks an inventive step under PCT Article 33(3) as being obvious over Beutler. Beutler does not disclose a tube including a plurality of indentations formed by crimping as claimed. Beutler discloses a tube 1 including recesses 3 formed by a roll-forming tube 10 (column 4, lines 3 to 21). However, the recesses 3 are not formed by crimping as claimed. The claimed invention is not anticipated by Beutler.

Respectfully submitted, ~~PLI/PTO~~ 22 JUN 2005

CARLSON, GASKEY & OLDS, P.C.

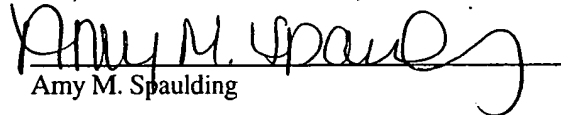


Karin H. Butchko - Agent

Dated: June 20, 2006

CERTIFICATE OF FACSIMILE

I hereby certify that this reply to written opinion is being facsimile transmitted to the United States Patent and Trademark Office, ATTN: IPEA/US, 571-273-3201 on June 20, 2006.



Amy M. Spaulding

CLAIMS

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1. A method of forming a tube comprising the steps of:
positioning the tube in a mold;
5 crimping the tube with the mold to form a plurality of indentations on the tube;
and
releasing the mold from the tube.

2. The method as recited in claim 1 further including the steps of moving the tube
10 relative to the mold after the step of releasing the mold and then crimping the tube with
the mold to form another of the plurality of indentations on the tube.

3. The method as recited in claim 2 wherein the step of moving includes translating
the tube relative to the mold.

15 4. The method as recited in claim 2 wherein the step of moving includes rotating
the tube relative to the mold and translating the tube relative to the mold.

5. The method as recited in claim 4 wherein the step of rotating the tube includes
20 rotating the tube relative to the mold between approximately 5 to 10°.

6. The method as recited in claim 1 wherein the tube includes end portions
substantially free of the plurality of indentations.

25 7. The method as recited in claim 1 wherein the plurality of indentations are each
substantially parallel to a length of the tube.

8. The method as recited in claim 1 wherein the plurality of indentations are
obliquely angled with respect to a length of the tube.

30 9. The method as recited in claim 1 wherein the tube has a substantially circular
cross-section.

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10. The method as recited in claim 1 further including the step of moving the tube relative to the mold to form at least one groove before the step of releasing the mold
5 from the tube.

11. The method as recited in claim 10 wherein the step of moving includes rotating the tube relative to the mold and translating the tube relative to the mold.

10 12. The method as recited in claim 11 wherein the step of rotating includes rotating the tube relative to the mold between approximately 5 to 10°.

13. The method as recited in claim 10 wherein the step of moving includes translating the tube relative to the mold.

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14. The method as recited in claim 10 wherein the mold includes a roller that engages the tube to form the at least one groove.

15. A heat exchanger comprising:
20 a plurality of tubes each including a plurality of indentations;
a shell portion surrounding the plurality of tubes; and
a valve that controls a flow of a first fluid into the plurality of tubes.

16. The heat exchanger as recited in claim 15 wherein a second fluid flows through
25 the shell and around the plurality of tubes, and the first fluid exchanges heat with the second fluid.

17. The heat exchanger as recited in claim 15 wherein the plurality of indentations are substantially parallel to the flow of the first fluid through the plurality of tubes.

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18. The heat exchanger as recited in claim 15 wherein the plurality of indentations are obliquely angled to the flow of the first fluid through the plurality of tubes.

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19. The heat exchanger as recited in claim 15 wherein a mold crimps the plurality of tubes to form the plurality of indentations on the tube.
- 5 20. The heat exchanger as recited in claim 15 wherein the plurality of tubes each have a substantially circular cross-section.
21. The heat exchanger as recited in claim 15 wherein the plurality of tubes each include end portions substantially free of the plurality of indentations.
- 10 22. A tube formation assembly comprising:
a tube; and
a mold that crimps the tube to form at least one indentation on the tube.
- 15 23. The tube formation assembly as recited in claim 22 further including a moving device that moves the tube relative to the mold.
24. The tube formation assembly as recited in claim 22 wherein the mold further includes a roller that crimps the tube.
- 20 25. The tube formation assembly as recited in claim 22 wherein the plurality of indentations are substantially parallel to a length of the tube.
26. The tube formation assembly as recited in claim 22 wherein the plurality of
25 indentations are obliquely angled with respect to a length of the tube.
27. The tube formation assembly as recited in claim 22 wherein the tube has a substantially circular cross-section.
- 30 28. The tube formation assembly as recited in claim 30 wherein the tube includes end portions substantially free of the plurality of indentations.

AMENDED SHEET